

ABSTRACT OF THE INVENTION

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3 A phase detector having improved dynamic range, frequency range,
4 multiplication factor range, and detector gain. The detector converts a reference signal
5 into a square wave. The square wave signal causes a step recovery diode in a sampling
6 phase detector to trigger on a leading edge to obtain a more consistent and more precise
7 sampling of an oscillator signal. The phase detector includes a saturated amplifier to
8 convert the reference signal to a square wave signal, a transformer to impedance match
9 the amplifier with the sampling phase detector and to generate a balanced output of the
10 square wave signal. The sampling phase detector generates a phase error signal
11 indicative of the phase difference between the reference signal and the oscillator signal.
12 The sampling phase detector includes balanced outputs having oppositely-phased phase
13 error signals. A potentiometer is provided to reduce or eliminate any imbalances in the
14 oppositely-phased phase error signals.